PESTICIDE FIRES - PREVENTION, CONTROL, AND CLEANUP

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ACKNOWLEDGEMENTS

PREPARED BY

ARMED FORCES PEST MANAGEMENT BOARD
AD HOC COMMITTEE ON PREVENTION AND CONTROL
OF PESTICIDE FIRES

Committee members: Dr. E. S. Evans, Chairman; CDR T. H. Dickens; Capt T. H. Lillie; Mr. M. G. Acock; and Mr. J. H. Tarnopol. Adapted for the AFPMB from a technical guide entitled, "Guide for the Prevention, Control, and Cleanup of Pesticide Fires" prepared by Mr. R. D. Wells, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD 21010.

1. INTRODUCTION

a. A fire involving pesticides, as with any fire involving toxic chemicals, may create unique problems. The usual hazards presented by a fire are compounded by the danger of pesticide poisoning and widespread environmental contamination. Proper planning and training can greatly reduce the personal harm and environmental damage possible from a fire involving pesticides.

b. The intent is to assist installation personnel to deal with fires involving pesticides by presenting general standards of good practice. This Technical Information Memorandum (TIM) has been prepared to aid installation personnel prevent, control, and cleanup a pesticide fire. This TIM is not intended to supercede or preclude existing responsibilities and requirements outlined in military component regulations.

c. Slide presentations entitled "Agricultural Chemical Emergencies, Spills and Fires" and "Firefighting Tactics, Agricultural Pesticides and Fertilizers" which contain the same information as this guide are available for loan by writing to: Chevron Chemical Company, Employee Relations - Safety, P.O. Box 3744, San Francisco, CA 94119.

d. A training package for firefighters entitled "Pesticide Fire and Spill Control" (January 1980) is available at a cost of $250 from: National Fire Protection Association, Publication Department, Batterymarch Park, Quincy, MA 02269, telephone (617) 328-9290. This package is available on loan from the Commander, US Army Center for Health Promotion and Preventive Medicine (USACHPPM), ATTN: Pest Management Branch, Aberdeen Proving Ground, MD 21010. A city or state fire academy may also have this information available.

e. A major source of information on the proper handling and storage of those pesticides considered to be flammable or combustible items, is the National Fire Protection Association (NFPA) codes and standards. Those codes and standards, pertinent to the subject of this TIM, which are recommended for review are given in Appendix D. These publications are available from the NFPA at the address given in the above paragraph.

2. PREFIRE PLANNING

a. General. The success of minimizing the hazard to the health and environment during a pesticide fire will depend upon adequate prefire planning. Time-consuming preparations and difficult decisions should be made in advance rather than during an emergency situation. All applicable organizations, particularly the fire department, should participate in the preparation of the prefire plan. A single individual or activity (e.g., pest management coordinator, safety officer, fire department) should prepare and coordinate the plan. The plan should be put in writing so that all appropriate organizations can be notified [as specified in 40 Code of Federal Regulations (CFR) 165.10(g) (1)]. It should be updated at least annually, and more frequently if major changes of pesticides stored or modifications to the facility are made. An added benefit of prefire

planning is that potential hazards are often identified and eliminated. The prefire plan should represent a detailed analysis of the installation's procedures to handle a toxic chemical fire and should address those points listed below.

b. Facility Floor Plan. Include a floor plan of the facility which indicates where permanent inside walls, all external openings such as doors and windows, and pesticides are located. Pesticide storage areas and the mixing area should be clearly identified.

c. Pesticide Inventory. A copy of a current pesticide inventory should be provided to the local fire department. Updates to this list should be provided at least quarterly.

d. Access Routes. Primary and alternate access routes to the pesticide facility from all directions should be included because primary access may be blocked by toxic smoke. Smoke from a pesticide fire is not a nuisance that can be driven through, but must be presumed highly toxic.

e. Evacuation Routes. Evacuation routes that have been established with the installation police should be identified. Evacuation routes, as with access routes, must be developed in all directions so that toxic smoke can be avoided. This plan should also include procedures to secure the area to prevent unauthorized entry.

f. Water Runoff Control. Planning water runoff control is a very important part of prefire planning. Identify where there is a potential for water runoff and determine how to prevent contamination of waterways. Arrangements for equipment and supplies necessary to construct dikes or dams should be included in the prefire plan. Do not rely solely on equipment and supplies located at or near the pesticide facility as they may be inaccessible because of toxic smoke.

g. Map of Area. Provide a may (may be hand drawn) of the area surrounding the pesticide facility. The map should include: location of water supplies; perimeter fences, with all gates shown; adjacent buildings/activities with contents/functions of each shown; nearby ditches, underground drains, creeks and rivers with arrows to show direction of flow; building access and evacuation routes; where and how the water runoff may be blocked; and north arrow.

h. Emergency Telephone Numbers. Include a list of telephone numbers where key personnel can be contacted day or night. As a minimum this list should include the following:

(1) Installation Police (security).

(2) The pesticide facility supervisor who must be contacted as soon as possible because he will know what pesticides are currently located in the facility.

(3) A physician who is familiar with pesticide poisoning.

(4) The Installation Spill Coordinator or equal.

(5) The CHEMTREC* (800-424-9300); for calls within the Dictrict of Columbia, 483-7616; for calls originating outside the continental US, 202-483-7616.

(6) The local poison control center.

(7) The USACHPPM Pesticide Hotline† (301-671-3773), DSN 584-3773).

(8) Emergency numbers listed on the pesticide labels, that may enable liaison with the pesticide manufacturer during the emergency.

(9) The Regional US Environmental Protection Agency (EPA) Office and the comparable State agency.

(10) The Coast Guard, if water runoff can reach a waterway.

i. Medical Assistance. The prefire plan should make provisions for medical assistance to personnel contaminated with pesticides. Local hospitals and poison control centers must be aware of the hazards of a pesticide fire so that poisoning or other pesticide-related illnesses can be properly treated. The plan should establish a first-aid center near the fire site to provide medical checks to firefighters or others as needed. Guidance on how to prepare for pesticide poisonings can be obtained from the local poison control centers, the pesticide label, or other information available from the pesticide manufacturers. The USACHPPM Occupational and Environmental Medicine Division (301-671-2714, DSN 584-2714) and the Navy Disease Vector Ecology and Control Center, Jacksonville, FL (904) 772-2424, DSN 942-2424) may also be able to provide information. References 5 and 6 listed in Appendix D will be of value in preparing for pesticide poisonings.

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* CHEMTREC stands for Chemical Transportation Emergency Center, a public service of the Manufacturing Chemists Association which provides immediate advice, 24 hours a day, for those at the scene of emergencies, then promptly contacts the manufacturer of the chemicals involved for more detailed assistance and appropriate follow-up. Questions regarding the operation of CHEMTREC should be directed to: Manager, Chemical Transportation Emergency Center, 1825 Connecticut Avenue, N.W., Washington, DC 20009, telephone (202) 887-1100.
† General pesticide toxicity information available from 0730 to 1630 hours eastern time. During USACHPPM nonduty hours, questions may be recorded on a telephone answering system.

j. Salvage/Hazard Evaluation. A salvage-versus-hazard evaluation is made to decide whether or not to let the facility burn in the event of a fire. The evaluation balances the salvage value of

the facility and its contents against the hazards of fighting the fire. Hazards may include widespread contamination by water runoff or toxic fallout from contaminated steam and toxic compounds released into the air from the incomplete combustion of the pesticides. If the decision cannot be made during prefire planning, then an agreement should be prepared (in writing) with the fire department which allows the on-scene commanding officer of the firefighting unit to determine whether or not to let the facility burn.

k. Safety Briefings. The prefire plan should make provisions for periodic safety briefings for all appropriate personnel. These briefings should include, as a minimum, familiarization with first-aid precedures and symptoms of pesticide poisoning. Basic first-aid procedures and symptoms of pesticide poisoning are presented in Appendix A.

l. Informing Emergency Organizations. A copy of the prefire plan and each annual update should be provided to each emergency organization or service that would be involved in a pesticide fire.

3. BURNING CHARACTERISTICS OF PESTICIDES. While not all pesticides are flammable, they will decompose in the heat of a fire and may release toxic gases, vapors, and smoke. Installation pesticide storage facilities usually store a wide variety of pesticides. Therefore, unless it is known specifically what is burning, It must be assumed that highly toxic substances are being produced. Burning characteristics of commonly encountered formulations are described in Appendix B and are outlined in reference 3, Appendix D.

4. FIRE NOTIFICATION PROCEDURES

a. When a fire is discovered, all nearby personnel should be alerted and the fire department contacted. Fight the fire only if it can be done safely; otherwise, evacuate to an upwind position. When fighting the fire, appropriate personal protective equipment must be worn. Fighting the fire before notification of the fire department is done only if it is certain that the fire can be easily extinguished.

b. Upon receipt of a call, the dispatcher of the fire department or the designated installation command post will, in addition to the dispatch of firefighting units:

(1) Contact the facility supervisor. The supervisor should be present at the fire because he will know which pesticides are present, how much of each, and where they are located. The last inventory may not be accurate as the location and quantity of the pesticides stored often change.

(2) Contact the spill coordinator. The spill coordinator may be able to provide assistance regarding the containment of water runoff that may be contaminated with pesticides.

(3) Alert medical personnel. Medical care must be available to treat pesticide poisoning which may occur to personnel located downwind from the fire as well as firefighters.

(4) Contact installation police (security). The police may need to implement the evacuation plan and isolate the area surrounding the fire. The police may also have to patrol the area to prevent reentry into the evacuated area.

(5) Contact CHEMTREC. It is important that liaison with CHEMTREC be initiated as soon as possible so that important technical data and poison control information will be available when needed.

5. FIREFIGHTING TACTICS

a. The first action that must be taken upon arrival of fire fighters at the fire site is to decide whether or not to let the facility burn. If this decision was not made during the prefire planning, then it is made by the commanding officer of the firefighting unit, based upon contingency plans formed during the prefire planning.

b. The fire should be attacked from upwind to avoid toxic smoke and from a safe distance so that firefighters are clear of the danger of exploding containers.

c. Evacuate personnel located downwind from the fire and keep unauthorized individuals from entering fire area.

d. Firefighters should wear personal protective equipment consisting of rubber or neoprene gloves, boots, turnouts, and helmet. A self-contained positive pressure designed breathing apparatus should be worn whenever fighting a pesticide fire. The articles of protective equipment mentioned above are standard components of onsite firefighting equipment and therefore should be on hand at the installation fire department (reference 4, Appendix D).

e. Avoid contact with pesticide material, smoke, mist, and water runoff. Be checked for symptoms of pesticide poisoning during the fire (see Appendix A). In case of contact, leave site immediately and apply first-aid procedures (Appendix A). Wash face and hands before eating, drinking, smoking, or using the toilet. Do not put fingers in mouth or rub eyes. If turnout clothing becomes soaked through after contact with fallout, leave fire site immediately, remove contaminated clothing, and shower. Firefighters should be immediately relieved from duty and checked for possible poisoning if exposed to fumes or smoke without adequate protection.

f. The fire should be controlled and confined by cooling adjoining structures to prevent spread of the fire.

g. As little water as possible should be used when fighting a pesticide fire. Water runoff, which must be assumed toxic, can be a serious problem because the water will spread contamination over a wide area. The water runoff control plan should be implemented to contain

the contaminated water within as small an area as possible. Water will cool the burning pesticides and may prevent the decomposition of the pesticides into less toxic compounds. Steam from water on the fire can result in toxic fallout which could spread contamination far from the fire site.

h. The fog spray, which is most effective, should be used for fighting pesticide fires. Straight stream should not be used because it may break bags and bottles which could result in adding fuel to the fire and increasing the amount and area of contamination.

i. Consider using foam when large volumes of flammable solvents are released from ruptured containers.

j. Firefighters should remove protective clothing upon leaving the fire site. This clothing should be impounded with contaminated equipment awaiting decontamination. At the fire station they must shower and shampoo thoroughly and change into clean clothing. Inner clothing worn while fighting the fire should be washed in detergent and bleach in a wash load separate from normal washings.

k. Contaminated firefighting protective clothing and equipment should be decontaminated by washing thoroughly with a strong (heavy duty) nonphosphorous detergent. Coveralls, gloves, and boots should be worn when decontaminating equipment. Cotton-jacketed hoses must be pressure tested and discarded if they were weakened by detergent.

6. POSTFIRE CLEANUP

a. The fire scene should be secured to keep out unauthorized personnel until cleanup and decontamination have been completed. Post warning signs and rope off burned-out area and water run-off area.

b. Appropriate Federal, State and local organizations (i.e., Regional EPA Office, the comparable State agency and the State Public Health Office) should be included when developing the cleanup plan. For example, these agencies must participate in the location of an “approved” site for disposal of pesticide-contaminated waste and debris.

c. All workers participating in the cleanup operations must be thoroughly briefed on the potential hazards. They must also be aware of first-aid procedures in case of contact with pesticides or contaminated material and symptoms of pesticide poisoning.

d. All personnel working within the fire site during cleanup should wear, as a minimum, personal protective equipment consisting of gloves, boots, coveralls and respirator. A list of protective equipment approved for handling pesticides is contained in TIM 14 (reference 1).

e. A “clean area” should be established to provide a break area for the cleanup crew. This area should have eating and toilet facilities. A place should be included to remove and hang up contaminated protective clothing and to wash up before entering the clean area.

f. When leaving the fire site at the end of the duty day or when work is completed, workers should remove contaminated clothing, shower thoroughly, and change to clean clothing. Contaminated clothing should be washed in strong (heavy duty) nonphosphorous detergent and bleach in a separate wash load.

g. Materials-handling equipment should be used whenever possible to minimize human contact with contaminated debris. All equipment should be made of metal to expedite decontamination. Porous materials, such as wood, cannot be decontaminated and therefore, if contaminated, must be destroyed. Vehicles used to transport debris must be enclosed and leakproof to prevent the spread of contaminated material along the route to the disposal site. Trucks if used, should have metal beds.

h. Dikes should be constructed around drains to prevent spilled pesticide or other contaminated material from entering the storm and sanitary sewer systems during cleanup.

i. Pesticide containers must be handled carefully to prevent spillage of the contents as they may have been damaged during the fire.

j. Concentrated pesticides that are spilled during the postfire cleanup should be cleaned up as follows:

(1) Stop the leak. Do whatever is necessary, such as uprighting the container, to limit the spill.

(2) Confine the spill to prevent it from spreading. Encircle a liquid spill with a dike of sand or absorbent material.

(3) Always work in a well ventilated area because most pesticides liberate toxic vapors. Open enclosed areas to prevent the accumulation of toxic vapors while working. If it is impossible to ventilate, do not proceed with cleanup until a self-contained breathing apparatus is available. NEVER WORK ALONE. Always remain within sight of a work partner.

(4) Immediate clean up actions are: Cover liquid spills with an absorbent material and dry spills with a secured tarpaulin.

(a) Dry Spills. Sweep up the pesticide material and place it in plastic bags. Avoid brisk movements to keep dust from swirling into the air. Under windy conditions, lightly moisten the pesticide. The bagged pesticide should be taken to the disposal site with other debris.

(b) Liquid Spills. Absorb liquid pesticide with absorbent material, then sweep up the

material and place it in plastic bags. Work or rub the material into the pesticide either by broom or boot to absorb as much as possible. The bagged pesticide and absorbent material should be taken to the disposal site with other debris. Soil at the spill site should be removed to a depth of 3 inches below the wet surface line and taken to the disposal site. Soil samples should be taken and analyzed to assure that all the contaminated soil has been removed before fresh soil is added.

(5) Remove and replace wood and other porous materials because they cannot be adequately decontaminated.

k. The debris should be lightly sprinkled with water to reduce toxic dust. Use water sparingly as excess will have to be treated as a liquid spill.

l. Soil exposed to water runoff should be removed to a depth of at least 3 inches below the moist soil and taken to the disposal site. Soil samples should be taken and analyzed to assure that all the contaminated soil has been removed before fresh soil is added.

m. After the debris has been cleared, the fire site should be decontaminated. Work the decontamination solution that has been recommended by CHEMTREC or a pesticide manufacturer into all surfaces using stiff brooms. Soak up the solution with absorbent material. Sweep up the absorbent material, place it in a plastic bag, and take it to the disposal site.

n. When the cleanup of the fire site is completed, the equipment must be decontaminated. Discard or destroy contaminated equipment which contains porous material, such as wood handles, fiber or straw brooms, leather shoes, etc. because they cannot be effectively decontaminated. Wash the equipment with soap and water, then apply the recommended decontamination solution with a brush or mop. All surfaces should be thoroughly rinsed using a sparing amount of water. All wash and rinse water should be collected for disposal.

o. Additional information on the cleanup of pesticide-contaminated areas may be obtained from TIM 15, Pesticide Spill Prevention and Management (reference 2, Appendix D).

7. FIRE PREVENTION - PESTICIDE STORAGE RULES AND REQUIREMENTS

a. General. The following general rules for safe pesticide storage, which would apply to all pesticide formulations, should be followed to reduce the potential for and hazards associated with a pesticide fire.*

* This information was obtained in part from reference 3, Appendix D.

(1) Identify pesticide storage areas with prominent waterproof signs over each entrance, including windows if present, and on all sides of buildings (see NFPA Code 43D). Post appropriate fire hazard code signs on building.

(2) Post a list of pesticides stored, including flammable solvents, on the outside of the building, along with a storage floor plan.

(3) Provide updated pesticide inventory to local fire department.

(4) Keep storage areas locked when not in use.

(5) Store pesticide containers so that labels are visible from all ordinary avenues of approach.

(6) Keep pesticide containers away from windows and out of direct sunlight.

(7) Store those pesticides or containers which could be damaged by moisture or water off the floor.

(8) Keep combustibles away from heat sources (steam pipes, radiators, etc.). Look for information on flammability on each pesticide label and store accordingly.

(9) Do not store partially empty herbicide containers containing chlorates.

(10) Do not store pesticides near other fire hazards such as ammonium nitrate or calcium hypochlorite (see Appendix B).

(11) Keep a quantity of absorbent material on hand to absorb pesticide spills (see reference 2).

(12) Develop, maintain, and update annually a prefire plan (see paragraph 2).

(13) Inform local medical treatment facility of the potential hazards associated with the storage of pesticide items and verify that current treatment procedures are known and that appropriate antidotes are on hand.

(14) Obtain appropriate first-aid and firefighting equipment, be sure that you and your fellow employees are familiar with the proper operation of the equipment and make periodic inspections to insure that the equipment is operating properly.

b. Combustible and Flammable Liquids. In addition to those regulations which dictate procedures for the storage and handling of pesticides as toxic or hazardous materials, additional requirements must be considered when storing liquid pesticide formulations classified as combustible or flammable liquids. These requirements should be incorporated into new or existing pesticide storage facilities. Should a requirement differ from a similar requirement for handling toxic or hazardous substances, the more stringent requirement will be followed. Pertinent definitions have been selected from those given in reference 7, Appendix D, and are

given in Appendix C. The following information from Title 29, Section 1910.106(d) applies only to the storage of flammable or combustible liquids in drums or other containers (including flammable aerosols) not exceeding 660 gallons individual capacity:

(1) Design, Construction, and Capacity of Storage Cabinets.

(a) Maximum Capacity - Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.

(b) Fire Resistance - Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325°F when subjected to a 10-minute fire test using the standard time-temperature curve as set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1979. All joints and seams shall remain tight and the door shall remain securely closed during the fire test.

(c) Metal cabinets shall have the bottom, top, door, and sides constructed using at least No. 18 gage sheet iron and double walled with 1 1/2-inch air space. Joints shall be riveted, welded, or made tight by some equally effective means. The door shall be provided with a three-point lock and the door sill shall be raised at least 2 inches above the bottom of the cabinet.

(d) Wooden cabinets shall have the bottom, sides, and top constructed of an approved grade of plywood at least 1 inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be riveted and shall be fastened in two directions with flathead woodscrews. When more than one door is used, there shall be a riveted overlap of not less than 1 inch. Hinges shall be mounted in such a manner as not to lose their holding capacity due to loosening or burning out of the screws when subjected to the fire test.

(e) Cabinets shall be labeled in conspicuous lettering “Flammable - Keep Fire Away.”

(2) Design and Construction of Inside Storage Rooms.

(a) Construction. Inside storage rooms shall be constructed to meet the required fire-resistive rating for their use. Such construction shall comply with the test specifications set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1979. Where an automatic sprinkler system is provided, the system shall be designed and installed in an acceptable manner. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor.

Openings shall be provided with approved, self-closing fire doors. The room shall be liquid-tight where the walls join the floor. A permissible alternate to the sill or ramp is an open-grated trench inside of the room which drains to a safe location.

(NOTE: *A storm or sanitary sewer would not be acceptable*). Where other portions of the building or other properties are exposed, windows shall be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1979, for Class E or F openings. Wood at least 1 inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlay, and similar installations.

(b) Rating and Capacity. Storage in inside storage rooms shall comply with the following table.

TABLE. STORAGE IN INSIDE ROOMS

Fire protection* provided	Fire resistance	Maximum size	Total allowable quantities (gals/sq ft/floor area)
Yes	2 hours	500 sq ft	10
No	2 hours	500 sq ft	5
Yes	1 hour	150 sq ft	4
No	1 hour	150 sq ft	2

* Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system.

(c) Wiring. Electrical wiring and equipment located in inside storage rooms used for Class I liquids shall be approved under Subpart S of Part 1910, Title 29, for Class I, Division 2, Hazardous Locations; for Class II and Class III liquids, shall be approved for general use.

(d) Ventilation. Every inside storage room shall be provided with either a gravity or a mechanical exhaust ventilation system. Such system shall be designed to provide for a complete change of air within the room at least six times per hour (NOTE: *when occupied*). If a mechanical exhaust system is used, it shall be controlled by a switch located outside of the door. (NOTE: and *activated 5 minutes before entry*). The ventilating equipment and any lighting fixtures shall be operated by the same switch. A pilot light shall be installed adjacent to the switch if Class I flammable liquids are dispensed within the room. Where gravity

ventilation is provided, the fresh air intake, as well as the exhaust outlet from the room, shall be on the exterior of the building in which the room is located.

(e) Storage in Inside Storage Rooms. In every inside storage room there shall be maintained one clear aisle at least 3-feet wide. Containers over 30-gallons capacity shall not be stacked one upon the other. Dispensing shall be done by approved pump or self-closing faucet only.

(3) Storage Inside Building.

(a) Egress. Flammable or combustible liquids, including stock for sale, shall not be stored as to limit use of exits, stairways, or areas normally used for the safe egress of people.

(b) Office Occupancies. Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

(4) Flammable and Combustible Liquid Warehouse or Storage Buildings.

(a) If the storage building is located 50 feet or less from a building or line of adjoining property that may be built upon, the exposing wall shall be a blank wall having a fire-resistance rating of at least 2 hours.

(b) The total quantity of liquids within a building shall not be restricted, but the arrangement of storage shall comply with Tables H-14 or H-15 of Section 1910.106*.

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* These tables, found in Title 29, Section 1910.106, indicate that indoor storage of containers containing Class I, II, or III liquids is not permitted in the basement of a building. For indoor storage of portable tanks, only tanks containing Class II or III liquids may be stored in those basement areas where the storage area is protected.

(c) Containers in piles shall be separated by pallets or dunnage where necessary to provide stability and to prevent excessive stress on container walls.

(d) Portable tanks stored over one tier high shall be designed to nest securely, without dunnage, and adequate materials handling equipment shall be available

to handle tanks safely at the upper tier level.

(e) No pile shall be closer than 3 feet to the nearest beam, chord, girder, or other obstruction, and shall be 3 feet below sprinkler deflectors or discharge orifices of water spray, or other overhead fire protection systems.

(f) Aisles of at least 3-feet wide shall be provided where necessary for reasons of access to doors, windows, or standpipe connections.

(5) Fire Control.

(a) Suitable fire control devices, such as small hose or portable fire extinguishers shall be available at locations where flammable or combustible liquids are stored.

(b) At least one portable fire extinguisher having a rating of not less than 12-B units shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

(c) At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, nor more than 25 feet, from any Class I or Class II liquid storage area located outside of a storage room but inside a building.

(d) When sprinklers are provided, they will be installed in accordance with Title 29, Part 1910.159.

(e) Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

(f) Materials which will react with water shall not be stored in the same room with flammable or combustible liquids.

8. TECHNICAL ASSISTANCE. Informal technical advice or assistance concerning the material presented in this TIM as well as comments or corrections to material presented may be directed to the Executive Secretary, AFPMB, at (301) 295-7476 or DSN 295-7476.

APPENDIX A

FIRST-AID PROCEDURES

1. In the event of pesticide contact, perform basic first-aid procedures and get medical attention

immediately. If possible take labeled container.

2. The basic first-aid procedures in the event of pesticide contact are: if in the eye, flush eye with water for 15 minutes; if on clothing, remove contaminated clothing and wash skin with soap and water; wash contaminated clothing with strong detergent before reusing.

3. The pesticide labels should be reviewed for any additional first-aid procedures. Duplicate labels should be on file away from storage site.

4. The symptoms of pesticide poisoning include blurred vision, difficulty in breathing, severe running nose, nausea, drooling, tearing, unusual amount of sweating, stomach cramps, and trembling. Pesticide poisoning symptoms often resemble those for heat prostration, smoke inhalation, and the flu. In general, it should be emphasized that medical attention should be obtained if any feeling of discomfort or illness or unusual appearance occurs.

5. Remain alert to symptoms of pesticide poisoning because the symptoms may be delayed up to 12 hours after expsoure.

APPENDIX B

FORMULATION BURNING CHARACTERISTICS

1. Oil Solution Formulations. Oils may burn readily and containers may rupture or explode when

overheated.

2. Aerosol Containers. May explode when heated.

3. Dust Formulations. Finely divided dusts may ignite as easily as vapors and may be explosive in nature.

4. Wettable Powder Formulations. Wettable powder pesticide formulations consist of pesticide on or mixed with clay. Since clay will not burn, the only potential for fire is the bag.

5. Water-based Formulations. Water-based pesticide formulations do not pose a fire hazard because of the water. There is, however, the potential for contaminated steam if exposed to fire.

6. Solvent-based Formulations. Solvent-based pesticide formulations contain petroleum distillates such as xylene, toluene, and petroleum oils (i.e., fuel oils, mineral oils, and mineral spirits). The solvents used in pesticide formulations are generally flammable and, as a result, these pesticide formulations pose the greatest fire hazard.

7. Pesticide/Fertilizer Formulations. Pesticide and fertilizer formulations contain ammonium sulfate and/or ammonium phosphate as the fertilizer. These fertilizers will not burn but, like pesticides, will decompose and release toxic vapors or smoke in the heat of a fire.

8. Chlorate Herbicides. Chlorates present in some herbicides and dessicants are flammable and explosive. Partially empty containers should not be stored.

9. Ammonium Nitrate Fertilizer. This fertilizer, if uncontaminated, is relatively safe when properly stored and handled. However, when contaminated by fats, oils, acids, finely divided metals, sulfur, etc., it becomes highly flammable and explosive. Large amounts of oxygen are given off when this fertilizer burns, increasing the intensity of the fire. Toxic gases may also be emitted. Ammonium nitrate must **not** be stored with pesticides or other possible contaminants.

10. Calcium Hypochlorite. This disinfectant is a powerful oxidizer and will react, ignite, and possibly explode if contaminated by organic substances. This material should **not** be mixed indoors nor stored with pesticides.

11. Fumigants. Those fumigant materials contained in compressed gas cylinders will vent if heated and may explode. Cylinders may become airborne.

APPENDIX C

COMBUSTIBLE AND FLAMMABLE LIQUID DEFINITIONS

1. Aerosol - a material which is dispensed from its container as a mist, spray, or foam by a propellent under pressure.

2. Closed container - a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

3. Container - any can, barrel or drum.

4. Flashpoint - the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

5. Combustible liquid - any liquid having a flashpoint at or above 100°F (37.8°C). Combustible liquids shall be divided into two classes as follows:

    a. Class II liquids - those with flashpoints at or above 100°F (37.8°C) and below 140°F (60°C).

    b. Class III liquids - those with flashpoints at or above 140°F (60°C). Class III liquids are subdivided into two subclasses:

        (1) Class IIIA liquids - those with flashpoints at or above 140°F (60°C) and below 200°F (93.3°C).

        (2) Class IIIB liquids - those with flashpoints at or above 200°F (93.3°C).

6. Flammable liquid - any liquid having a flashpoint below 100°F (37.8°C). Flammable liquids shall be known as Class I liquids. Class I liquids are divided into three classes as follows:

    a. Class IA - liquids having flashpoints below 73°F (22.8°C) and having a boiling point below 100°F (37.8°C).

    b. Class IB - liquids having flashpoints below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C).

    c. Class IC - liquids having flashpoints at or above 73°F (22.8°C) and below 100°F (37.8°C).

7. Office occupancy - the occupancy or use of a building or structure, or any portion thereof, for the transaction of business, or the rendering or receiving of professional services.

8. Portable tank - a closed container having a liquid capacity over 60 US gallons and not intended for fixed installation.

9. Safety can - an approved container, of not more than 5-gallons capacity, having a spring-closing lid and spout cover so designed that it will safely relieve internal pressure when subjected to fire exposure.

10. Ventilation - as used in 1910.106 for the prevention of fire and explosion, is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentration over one-fourth of the lower flammable limit.

APPENDIX D

REFERENCES

Armed Forces Pest Control Board Technical Information Memorandum (TIM) 14, Protective Equipment for Pest Control Personnel, 1978.

Armed Forces Pest Management Board TIM 15, Pesticide Spill Prevention and Management, 1980.

Dewey, J. E. and R. F. Pendleton, Fire Protection for Pesticide Storages, from Supplement II of Northeast Pesticide Information Manual.

International Fire Service Training Association, IFSTA 209, Firefighter Occupational Safety.

DVECC Jacksonville Wall Chart, Emergency Medical Treatment for Acute Pesticide Poisoning, 1979. Available from Navy Disease Vector Ecology and Control Center, Box 43, NAS, Jacksonville, FL 32212.

Morgan, D. P., 1977, Recognition and Management of Pesticide Poisonings, Second Edition, US Environmental Protection Agency Office of Pesticide Programs, Washington, DC 20460 (Available from Superintendent of Documents, US GPO, Washington, DC 20420, Stock Number 055-004-00013-7).

NFPA 10-1978, Standard for Portable Fire Extinguishers, Boston: National Fire Protection Association.

NFPA 13-1980, Standard for the Installation of Sprinkler Systems.

NFPA 30-1981, Flammable and Combustible Liquids Code.

NFPA 43A-1980, Code for the Storage of Liquid and Solid Oxidizing Materials.

NFPA 43D-1980, Code for Storage of Pesticides in Portable Containers.

NFPA 70-1981, National Electrical Code.

NFPA 80-1979, Standard for Fire Doors and Windows.

NFPA 220-1979, Standard on Types of Building Construction.

NFPA 231-1979, Standard for Indoor General Storage.

NFPA 231A-1975, Recommended Site Practices for Outdoor General Storage.

NFPA 251-1979, Standard Methods of Fire Tests of Building Construction and Materials.

NFPA 321-1976, Standard on Basic Classification of Flammable and Combustible Liquids.

NFPA 490-1980, Code for the Storage of Ammonium Nitrate.

NFPA 491M-1975, Manual of Hazardous Chemical Reactions.

NFPA 704-1980, Standard System for the Identification of the Fire Hazards of Materials.

Pre-Planning and Guidelines for Handling Agricultural Chemical Fires. National Agricultural Chemicals Association, 1979.

Title 40, Code of Federal Regulations (CFR), 1979 ed., Section 165.10, Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers.

Title 29, CFR, 1978 ed., Section 1910.106, Flammable and Combustible Liquids.